

PATENT ABSTRACTS OF JAPAN

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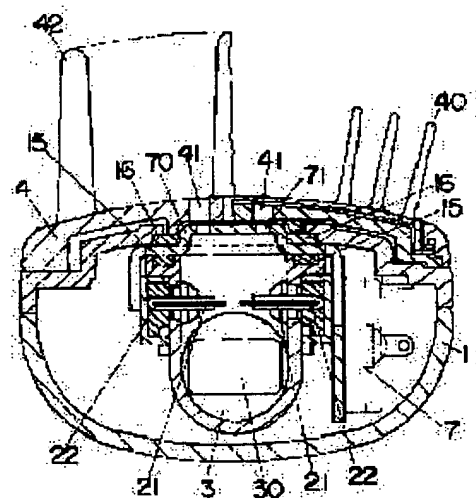
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HAYASHI MASAYUKI

(54) STEAM HAIR BRUSH

(57)Abstract:

PURPOSE: To constitute the steam hair brush so that it is softer to hair, and also, has a repair effect to damage of hair.

CONSTITUTION: In the steam hair brush provided with a steam generating mechanism 3, and steam holes 41 for ejecting steam generated in the steam generating mechanism to the outside, a discharge electrode 21 is arranged in a steam passing part between a steam generating part in the steam generating mechanism and the steam hole, and also, a discharge area of the discharge electrode is enlarged.



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CLAIMS

[Claim(s)]

[Claim 1] The steam hair brush characterized by making discharge area of a discharge electrode into size in a steam hair brush equipped with steam developmental mechanics and the steam hole which makes the steam generated in steam developmental mechanics blow off outside while arranging the discharge electrode in the steam passage section between the steam generating sections and the steam holes in steam developmental mechanics.

[Claim 2] The steam hair brush characterized by narrowing the steam passage section near a discharge electrode in a steam hair brush equipped with steam developmental mechanics and the steam hole which makes the steam generated in steam developmental mechanics blow off outside while arranging the discharge electrode in the steam passage section between the steam generating sections and the steam holes in steam developmental mechanics.

[Claim 3] The steam hair brush characterized by to have prepared the hole of the air insulation of the York size of a high-pressure transformer in the printed circuit board for support of the high-pressure transformer for high-pressure electrical-potential-difference generating supplied to a discharge electrode in a steam hair brush equipped with steam developmental mechanics and the steam hole which makes the steam generated in steam developmental mechanics blow off outside while arranging the discharge electrode in the steam passage section between the steam generating sections and the steam holes in steam developmental mechanics.

[Claim 4] The steam hair brush characterized by locating the discharge electrode by the side of low voltage in the heater side for dew condensation prevention in a steam hair brush equipped with steam developmental mechanics and the steam hole which makes the steam generated in steam developmental mechanics blow off outside while arranging the discharge electrode in the steam passage section between the steam generating sections and the steam holes in steam developmental mechanics.

[Claim 5] The steam hair brush characterized by to have a discharge monitor means to supervise discharge voltage and to stop discharge by the rise of discharge voltage in a steam hair brush equipped with steam developmental mechanics and the steam hole which makes the steam generated in steam developmental mechanics blow off outside while arranging the discharge electrode in the steam passage section between the steam generating sections and the steam holes in steam developmental mechanics.

[Claim 6] The lead wire which results in the heater in a discharge electrode or steam developmental mechanics while arranging the discharge electrode in a steam hair brush equipped with steam developmental mechanics and the steam hole which makes the steam generated in steam developmental mechanics blow off outside in the steam passage section between the steam generating sections and the steam holes in steam developmental mechanics is a steam hair brush characterized by being arranged in order of an electrical potential difference.

[Claim 7] It is the steam hair brush with which it is characterized by the flat surface of the heating unit in steam developmental mechanics being parallel to a brush flat surface while arranging the discharge electrode in a steam hair brush equipped with steam developmental mechanics and the steam hole which makes the steam generated in steam developmental mechanics blow off outside in the steam passage section between the steam generating sections and the steam holes in steam developmental mechanics.

[Claim 8] The steam hair brush characterized by making the metal section on the front face of a heating unit in steam developmental mechanics into a discharge electrode ground side in a steam hair brush equipped with steam developmental mechanics and the steam hole which makes the steam generated in steam developmental mechanics blow off outside while arranging the discharge electrode in the steam passage section between the steam generating sections and the steam holes in steam developmental mechanics.

[Claim 9] The steam hair brush characterized by arranging the silence means between a discharge electrode and a steam hole in a steam hair brush equipped with steam developmental mechanics and the steam hole which makes the steam generated in steam developmental mechanics blow off outside while arranging the discharge electrode in the steam passage section between the steam generating sections and the steam holes in steam developmental mechanics.

[Claim 10] The steam hair brush characterized by arranging the silence means on the wall surface surrounding a discharge electrode in a steam hair brush equipped with steam developmental mechanics and the steam hole which makes the steam generated in steam developmental mechanics blow off outside while arranging the discharge electrode in the steam passage section between the steam generating sections and the steam holes in steam developmental mechanics.

[Claim 11] The steam hair brush characterized by having the silence means which made opening area of a steam hole smallness in a steam hair brush equipped with steam developmental mechanics and the steam hole which makes the steam generated in steam developmental mechanics blow off outside while arranging the discharge electrode in the steam passage section between the steam generating sections and the steam holes in steam developmental mechanics.

[Claim 12] The steam hair brush characterized by having the 2nd discharge electrode which starts discharge in a steam hair brush equipped with steam developmental mechanics and the steam hole which makes the steam generated in steam developmental mechanics blow off outside at the time of wear of a discharge electrode while arranging the discharge electrode in the steam passage section between the steam generating sections and the steam holes in steam developmental mechanics.

[Claim 13] The steam hair brush according to claim 12 characterized by having the monitor means of a current which flows to the 2nd discharge electrode, and the discharge halt circuit which stops discharge with the output of a monitor means.

[Claim 14] The steam hair brush characterized by to have formed short circuit diode, current-limiting resistance, and the diode for reverse ***** in the high-pressure generating circuit which generates the high-pressure electrical potential difference

which has a switching element and is supplied to a discharge electrode in a steam hair brush equipped with steam developmental mechanics and the steam hole which makes the steam generated in steam developmental mechanics blow off outside while arrange a discharge electrode in the steam passage section between the steam generating sections and the steam holes in steam developmental mechanics.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the steam hair brush which steam developmental mechanics can be built [brush] in and can make steam blow off.

[0002]

[Description of the Prior Art] It is used in order for a hair brush to have its hair cut in hair with the brush (bristle) and to prepare hair flow, but when brushing, the situation where do not hurt one's cuticle on the front face of hair by friction, or a hair set is not collected for static electricity produced in friction arises. For this reason, what was offered is a steam hair brush. As a steam hair brush which makes the steam which contained steam developmental mechanics in the vessel body equipped with the bristle, and was produced in the steam generating section of steam developmental mechanics blow off from the steam hole which carries out opening between bristles. Although various things are offered if what the warm air generating section blowing off also equipped with warm air conventionally is included. The steam which is generated and was made to generate steam because the steam developmental mechanics contacts moisture to the heating unit heated at the heater is made to blow off from a steam hole as it is.

[0003]

[Problem(s) to be Solved by the Invention] By the way, although WEBIHEA and the straight and long hair which used the Parma agent are in fashion recently, if it investigates for these men, age will not be asked, but if it has the admiration that about 80% of the woman is mourning over her hair and hair is actually analyzed, the cuticle on the front face of hair can observe the condition of having separated or floated. Moreover, when the Parma agent and a hair coloring agent are used or its hair is frequently shampooed using a shampoo agent, the data of inclining toward the alkalinity which is in the condition that a surface cuticle tends to exfoliate also have the hair which should be acidity essentially.

[0004] And although the above-mentioned steam hair brush is gentle to hair about such hair over which it mourned as compared with what does not spout steam, the hair over which it mourned cannot be repaired. Succeeding in this invention in view of such a point, the place made into the purpose is to offer the steam hair brush which has the repair effectiveness over the bruise of hair gently by hair.

[0005]

[Means for Solving the Problem] In a steam hair brush equipped with the steam hole which makes the steam which carried out the deer and was made to generate this invention in steam developmental mechanics and steam developmental mechanics blow off outside. While arranging the discharge electrode in the steam passage section between the steam generating sections and the steam holes in steam developmental mechanics. The steam passage section near a discharge electrode is narrowed [making discharge area of a discharge electrode into size,]. The hole of the air insulation of the York size of a high-pressure transformer is prepared in the printed circuit board for support of the high-pressure transformer for high-pressure electrical-potential-difference generating supplied to a discharge electrode. The discharge electrode by the side of low voltage is located in the heater side for dew condensation prevention. It has a discharge monitor means to supervise discharge voltage and to stop discharge by the rise of discharge voltage. The lead wire which results in the heater in a discharge electrode or steam developmental mechanics is arranged in order of an electrical potential difference. The flat surface of the heating unit in steam developmental mechanics is made parallel to a brush flat surface. The metal section on the front face of a heating unit in steam developmental mechanics is made into a discharge electrode ground side. The silence means is arranged [arranging the silence means between a discharge electrode and a steam hole,] on the wall surface surrounding a discharge electrode. The 2nd discharge electrode which starts discharge at the time of wear of a discharge electrode is prepared [having established the silence means which made opening area of a steam hole smallness,]. It has the monitor means of a current which flows to the 2nd discharge electrode, and the discharge halt circuit which stops discharge with the output of a monitor means. It has the description to have formed short circuit diode, current-limiting resistance, and the diode for reverse ***** in the high-pressure generating circuit which generates the high-pressure electrical potential difference which has a switching element and is supplied to a discharge electrode.

[0006]

[Function] According to this invention, since the steam breathed out from a steam hole turns to what was made detailed more under the effect of discharge between discharge electrodes, and was excellent in the permeability to hair up and serves as acescence, the hair used as alkalinity is returned to original acidity. And since poor discharge does not arise with the waterdrop by dew condensation of steam since discharge area of a discharge electrode is made into size, and the steam passage section near a discharge electrode is narrowed. Since the hole of the air insulation of the York size of a high-pressure transformer is prepared in the printed circuit board for support of the high-pressure transformer for high-pressure electrical-potential-difference generating which can perform putting steam to discharge certainly and is supplied to a discharge electrode. Since there is no leakage to a printed circuit board and the discharge electrode by the side of low voltage is located in the heater side for dew condensation prevention. Since it has a discharge monitor means for there to be no leakage by the side of a heater, to supervise discharge voltage, and to stop discharge by the rise of discharge voltage. Since the lead wire which discharge does not start in the location of an indeterminate and results in the heater in a discharge electrode or steam developmental mechanics is arranged in order of the electrical potential difference. Since fear of leakage makes the flat surface of a heating unit [in / it is very few and / steam developmental mechanics] parallel to a brush flat surface. Although it has a discharge electrode, since it

can stop thickness and the metal section on the front face of a heating unit in steam developmental mechanics is made into the discharge electrode ground side Reduction and thin-shape-izing of components mark can be achieved. Arrange a silence means between a discharge electrode and a steam hole, or Since the 2nd discharge electrode with which there is little leakage of a discharge sound, and it starts discharge at the time of wear of a discharge electrode since a silence means is arranged on the wall surface surrounding a discharge electrode or the silence means which made opening area of a steam hole smallness is established is prepared Since it has the monitor means of a current which discharge does not start in the location of an indeterminate at the time of wear of a discharge electrode, and flows to the 2nd discharge electrode, and the discharge halt circuit which stops discharge with the output of a monitor means The abnormalities in discharge can be detected exactly, discharge can be stopped, and since short circuit diode, current-limiting resistance, and the diode for reverse ***** are formed in the high-pressure generating circuit which generates the high-pressure electrical potential difference which has a switching element and is supplied to a discharge electrode, discharge of the stable cycle can be obtained.

[0007]

[Example] When this invention is explained in full detail based on the example of illustration below, one example is shown in drawing 1 - drawing 7 . In the bundle hand part 10 of the housing 1 of this steam hair brush, the high-pressure generating means 2 and the change-over switch 5 are arranged, and the steam developmental mechanics 3 is dedicated in the bristle applied part 11 which continues at bundle hand part 10 tip. This steam developmental mechanics 3 consists of a water absorption object 31 which leads the water in the water tank 35 whose attachment and detachment to the heating unit 30 heated at the heater to build in and the point of housing 1 were enabled to the front face of a heating unit 30. The check valve 39 shown in drawing 2 prepared in the water tank 35 is for installation of the open air to protect that will be in a reduced pressure condition and the amount of supply of the water to a heating unit 30 decreases, when internal water decreases in number.

[0008] The above-mentioned heating unit 30 is constituted as what pressed fit the electric insulation of the pair allotted to both sides of the heater 36 which is a positive thermistor, and this heater 36 through the electrode plate in the heater pipe 33, and the rust-like alumina plates 37 and 37 which go away for heat transfer, as shown in drawing 5 . The rib 34 of the root Motobe periphery of the heater pipe 33 is a thing for the steam leakage prevention when allotting in the bristle applied part 11, even if steam tends to leak from this part, serves as a liquid between ribs 34, and plays the role of a seal.

[0009] While the spraying plate 70 equipped with the steam hole 71 is arranged by the whole surface of the bristle applied part 11 of housing 1, as shown in drawing 3 , the bristle substrate 4 which allotted the bristle 40 of much details to multi-train annular is arranged free [attachment and detachment] by it. 14 in drawing is ** for attachment and detachment of this bristle substrate 4. Moreover, while penetrating the bristle substrate 4, many steam holes 41 which are open for free passage to the above-mentioned steam hole 71 are formed in the center section of the bristle substrate 4. In addition, the bristle substrate 4 shown here is for straight hair, and to WEBIHEA, as shown in drawing 6 , bristle substrate 4' equipped with the thicker bristle 42 is used.

[0010] The steam generated in the contact section with the steam generating section 30 in the above-mentioned steam developmental mechanics 3, i.e., a heating unit, and the water absorption object 31 is spouted in the space surrounded by bristles 40 and 42 through the above-mentioned steam holes 71 and 41. The flat surface which is the part which the water absorption object 31 of a heating unit 30 touches as shown in drawing 1 here is made parallel to a brush side because of stopping the whole thickness, and the clearance is secured in the perimeter of a heating unit 30, because the steam hole 41 and the steam generated in the reverse side can also be sent out to the steam hole 41.

[0011] And opposite arrangement of the discharge electrodes 21 and 21 of a pair connected to said high-pressure generating means 2 has been carried out at the steam passage section between the steam generating section and the steam holes 71 and 41. If arc discharge is made between this discharge electrode 21 and 21, the steam which arises in the steam generating section and faces to the steam hole 41 will be made detailed in case it passes through between the discharge electrode 21 under discharge, and 21. If it brushes making the steam made detailed blow off, thus, since the permeability of the moisture to hair is good While being able to obtain the result which has admiration gently, become good also as the bristle 40 to hair, stop applying a burden to hair, and since a discharge electrode 21 and the steam exposed to the arc between 21 serve as acescence, further The hair in the condition that are alkalinity and a cuticle tends to exfoliate can be brought close to original acidity (pH values 4-5), and the cuticle of hair can be prepared.

[0012] In drawing 1 , 7 is a heater for preventing the steam generated in the steam generating section dewing by the inside of the bristle applied part 11, and the end of the above-mentioned spraying plate 70 is equipped with it. Although it is the relation which arranges a discharge electrode 21, and dew condensation will arise extremely and it will become cheap if the temperature of the spraying plate 70 neighborhood is low since the distance from the steam generating section to the steam jet hole 41 becomes long, dew condensation is prevented by heating the spraying plate 70 formed by the thermal conductor at a heater 7. Moreover, 15 in drawing 2 and 16 are packing for leakage prevention of steam.

[0013] A circuit diagram is shown in drawing 7 . A change-over switch 5 is 3 location switch mold, and if one step is moved from an off position, it will energize at heaters 36 and 7 and one more step will be moved, it will be energized also in the high-pressure generating circuit 2. Switching element Q turned on on an electrical potential difference predetermined in the high-pressure generating circuit 2 to the upstream coil of Resistance R, Diode D, Capacitor C, the high-pressure transformer 20, and the high-pressure transformer 20 and juxtaposition is connected. Now, if a power source is supplied to a high-tension circuit 2, a charge will be charged by Capacitor C and the both-ends electrical potential difference of switching element Q will also rise. And if the both-ends electrical potential difference of switching element Q reaches a predetermined electrical potential difference, the charge charged by Capacitor C by ON of switching element Q will flow to the high-pressure transformer 20 through switching element Q, the high voltage will arise in secondary [of the high-pressure transformer 20], and space discharge will be carried out with discharge electrodes 21 and 21. The resistance R2 which has short-circuited between the upstream coil of the high-pressure transformer 20 and secondary coils is for stabilizing the potential of a secondary coil.

[0014] In here, although discharge electrodes 21 and 21 make tips counter and are arranged while they are usually formed as that in which the tip sharpened, by having formed the discharge electrode 21 for putting steam to discharge in this way, the situation which discharge stops by dew condensation of steam and adhesion in a discharge electrode 21 arises. In order to avoid such an unstable state, as shown in drawing 8 here, it considers as the shape of a fork which has two or more points [**** / bending the point of a discharge electrode 21 at the include angle of 90 degrees or less], and a pectinate form, or is considering as the gestalt which can discharge by two or more places by the shape of a bowl, discoid, and the thing that surround this as it is cylindrical and it is supposed that it is cylindrical.

[0015] Moreover, although the upstream and a secondary coil are wound around the perimeter in York 29 for the improvement in

magnetic properties through the coil bobbin as said high-pressure transformer 20 is shown in drawing 9, it is forming the bigger hole 28 than York 29 in the correspondence location of York 29 in the printed circuit board 27 in which this high-pressure transformer's 20 is attached, and the insulation between York 29 and a printed circuit board 27 is performed. The current revealed to York 29 from the secondary coil is further revealed to a printed circuit board 27, and he is trying not to destroy a circuit.

[0016] If it is easy to produce leakage also from the lead wire 74 and 75 which ties the high-pressure transformer 20 and discharge electrodes 21 and 21 and there is other low-pressure live part like the heater 7 for dew condensation prevention like the example of illustration, the high voltage will leak by the capacity component, or a noise will be easy to tell a power supply section through a heater 7, but in order to prevent this, in the example of illustration, the discharge electrode 21 of the side near a heater 7 is wired in the lead wire 75 of a side with low potential. Moreover, although the lead wire 76 and 77 which results in heaters 36 and 7 also has a ground and live-wire side, as shown in drawing 4, it depends on the same reason [also trying to stand in a line in order of the ground side lead wire 77, the live-wire side lead wire 76, the low voltage side high-pressure lead wire 75, and the high potential side lead wire 74].

[0017] The example shown in drawing 10 provides the baffle 60 so that the steam path of the discharge electrode 21 neighborhood may be narrowed and steam may surely pass through the discharge electrode 21 neighborhood. Moreover, in the example shown in drawing 11, the noise-proof wall 61 jutted out by turns between a discharge electrode 21 and the spraying plate 70 is established, and the leakage of the sound at the time of discharge is lessened. If the felt-like acoustic material 63 is formed as are shown in drawing 12, and shown in the concave convex acoustic material 62 or drawing 13, increase of the sound by resonance can be prevented. Furthermore, if magnitude of the steam holes 71 and 41 is made into about 3mm from the diameter of 1.5mm, while sound leakage can be made small in the magnitude and the configuration of a steam brush, it will not become the hindrance of jet of steam.

[0018] The circuit diagram shown in drawing 14 establishes the electrical-potential-difference detecting circuit V1 in the both ends of the secondary coil of the high-pressure transformer 20, and by the comparison by the comparator CP with the reference voltage generating circuit V0, if there is an abnormality rise of the electrical potential difference of a secondary coil, it shows what intercepted the current supply to the high-pressure generating circuit 2 at Relay Ry and its contact ry. Although it will become easy to produce discharge in parts other than discharge electrode 21 if wear of a discharge electrode 21 advances, it enables it to prevent this situation.

[0019] The 2nd discharge electrode 22 which counters at the somewhat larger spacing L2 than the spacing L1 of a discharge electrode 21 is prepared beforehand, and when a discharge electrode 21 is worn out and spacing L1 becomes large, you may make it discharge arise with the 2nd discharge electrode 22, as shown in drawing 15. In the example of illustration, it connected with the electric conduction pattern 25 in a printed circuit board 27, and the 2nd discharge electrode 22 is formed.

[0020] While stopping the high-pressure generating circuit 2 through relays Ry2 and ry2 in the high-pressure generating halt circuit 83 memorized with a flip-flop while detecting the current which flows to the 2nd discharge electrode 22 in a detector 82 and receiving the output, as shown in drawing 16, the deactivate indication circuit 84 is operated and you may make it indicate that it stopped. Discharge is made only once in 1 cycle by making an ON state also continue the section shown by three in drawing 18 after the example shown in drawing 17 and drawing 18 formed the short circuit diode D1, the current-limiting resistance Ri, and the diode D2 for reverse ***** in the high-pressure generating circuit 2 and discharge was made to switching element Q. It has prevented that the current of the period of the above 3 flows to the capacitor C for discharge, and the ON self-sustaining current of switching element Q decreases and turns off the current-limiting resistance Ri. In this case, since a discharge cycle is stabilized, it becomes what was stabilized by the sound made with discharge, and when a discharge sound is not stabilized, the insecurity which a user receives can be abolished. Moreover, the reinforcement of the capacitor C for discharge can be achieved to the reinforcement of the discharge electrode 21 by reduction of the count of discharge, other electrical parts, and a thing. In addition, drawing 18 (a) is [the both-ends voltage waveform of Capacitor C and (c) of a power-source wave and (b)] discharge waves.

[0021] The example shown in drawing 19 shows that for which the heater pipe 33 in the heating unit for steam generating on the other hand (low voltage side) of the discharge electrodes 21 and 21 of a pair was substituted.

[0022]

[Effect of the Invention] As mentioned above, in this invention, since the discharge electrode is arranged between the steam generating sections and the steam holes in steam developmental mechanics, the steam breathed out from a steam hole Since it turns to what was made detailed more under the effect of discharge between discharge electrodes, and was excellent in the permeability to hair up and becomes the acescence The hair used as alkalinity is returned to original acidity, and while being able to perform brushing gentle also to the hair over which it mourned, it also has the repair effectiveness of the hair over which it mourned. And since discharge area of a discharge electrode is made into size, the discharge which poor discharge did not arise with the waterdrop by dew condensation of steam, and was stabilized can be obtained.

[0023] moreover, by what was narrowed, the steam passage section near a discharge electrode It is what can perform putting steam to discharge certainly and can promote ionization of the steam by discharge. In what prepared the hole of the air insulation of the York size of a high-pressure transformer in the printed circuit board for support of the high-pressure transformer for high-pressure electrical-potential-difference generating supplied to a discharge electrode There are few possibilities that the circuit failure by the leakage to a printed circuit board may arise, in what located the discharge electrode by the side of low voltage in the heater side for dew condensation prevention, there is no leakage by the side of a heater, and damage on a heater and generating of a noise can be suppressed.

[0024] furthermore, in the thing equipped with a discharge monitor means to supervise discharge voltage and to stop discharge by the rise of discharge voltage Since the lead wire which results in a heater [in / discharge does not start in the location of an indeterminate, and it is safe, and / a discharge electrode or steam developmental mechanics] is arranged in order of the electrical potential difference Since fear of leakage makes the flat surface of a heating unit [in / it is very few and / steam developmental mechanics] parallel to a brush flat surface Although it has a discharge electrode, since it can stop thickness and the metal section on the front face of a heating unit in steam developmental mechanics is made into the discharge electrode ground side Since reduction and thin-shape-izing of components mark could be achieved, arrange a silence means, a silence means is arranged on the wall surface surrounding a discharge electrode or the silence means which made opening area of a steam hole smallness is established between the discharge electrode and the steam hole, there is little leakage of a discharge sound.

[0025] Moreover, since the 2nd discharge electrode which starts discharge at the time of wear of a discharge electrode is

prepared Since it has the monitor means of a current which discharge does not start in the location of an indeterminate at the time of wear of a discharge electrode, and flows to the 2nd discharge electrode, and the discharge halt circuit which stops discharge with the output of a monitor means The abnormalities in discharge can be detected exactly, discharge can be stopped, and since short circuit diode, current-limiting resistance, and the diode for reverse ***** are formed in the high-pressure generating circuit which generates the high-pressure electrical potential difference which has a switching element and is supplied to a discharge electrode, discharge of the stable cycle can be obtained.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

- [Drawing 1] It is the cross-sectional view of one example.
- [Drawing 2] It is drawing of longitudinal section same as the above.
- [Drawing 3] (a) is a front view same as the above, and (b) is a side elevation.
- [Drawing 4] (a) is a horizontal sectional view same as the above, and (b) is drawing of longitudinal section same as the above.
- [Drawing 5] It is the expanded sectional view of a heating unit.
- [Drawing 6] Other bristle substrates are shown, (a) is a front view and (b) is a side elevation.
- [Drawing 7] It is a circuit diagram same as the above.
- [Drawing 8] (a) - (f) is the explanatory view showing the example of a configuration of a discharge electrode, respectively.
- [Drawing 9] It is the sectional view showing the arrangement condition of a high-pressure transformer.
- [Drawing 10] It is drawing of longitudinal section of other examples.
- [Drawing 11] It is the cross-sectional view of another example.
- [Drawing 12] Furthermore, it is the cross-sectional view of other examples.
- [Drawing 13] It is the cross-sectional view of other examples.
- [Drawing 14] It is the circuit diagram of other examples.
- [Drawing 15] It is the explanatory view of another example.
- [Drawing 16] It is the circuit diagram of other examples.
- [Drawing 17] Furthermore, it is the circuit diagram of other examples.
- [Drawing 18] (a) - (c) is a timing diagram which shows the voltage waveform in a power source, the capacitor for discharge, and a discharge electrode same as the above.
- [Drawing 19] It is the explanatory view showing the other examples of a discharge electrode.

[Description of Notations]

- 3 Steam Developmental Mechanics
- 21 Discharge Electrode
- 40 Bristle
- 41 Steam Hole

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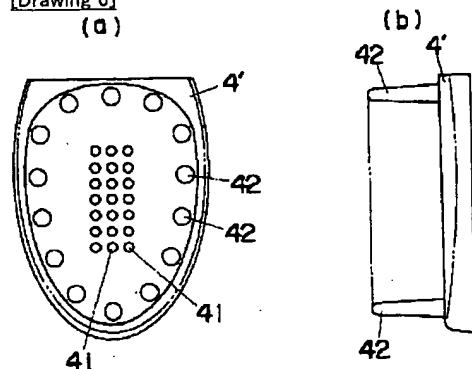
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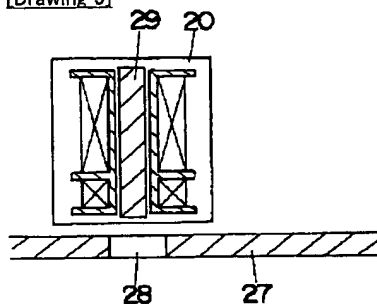
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DRAWINGS

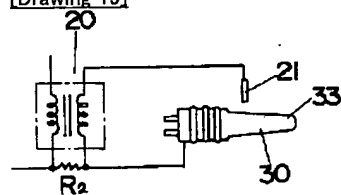
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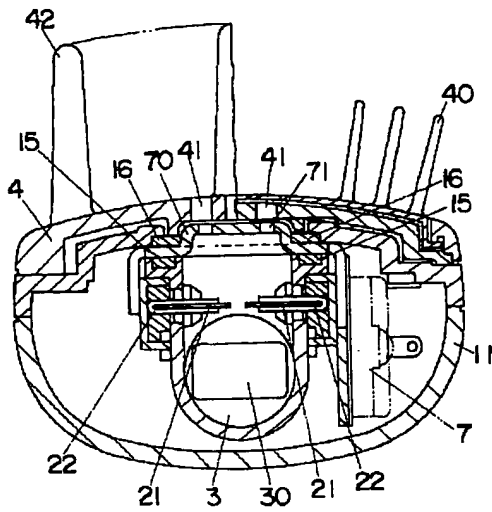
[Drawing 9]



[Drawing 19]



[Drawing 1]



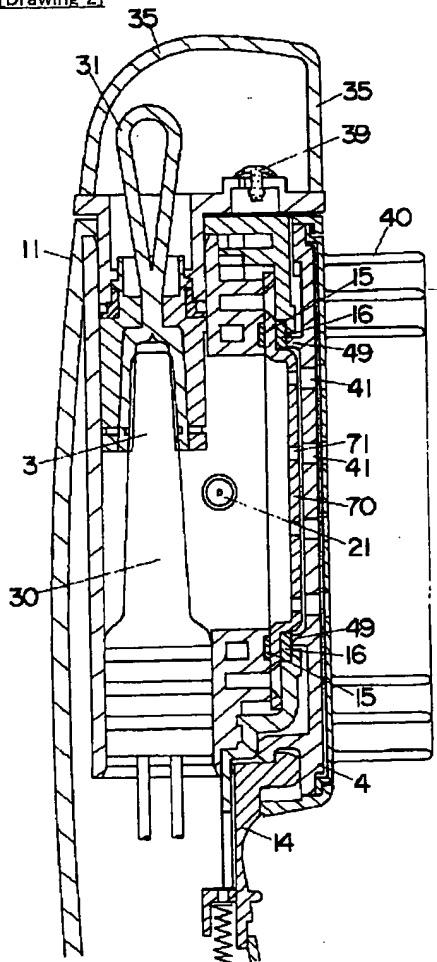
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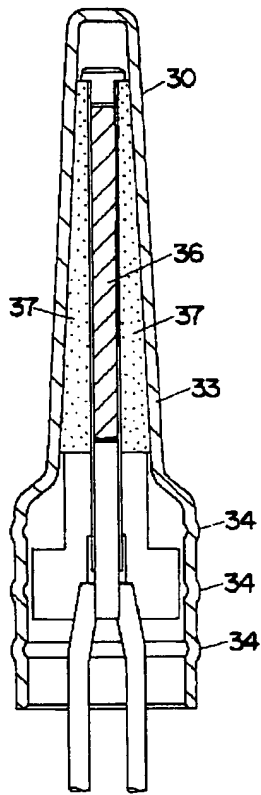
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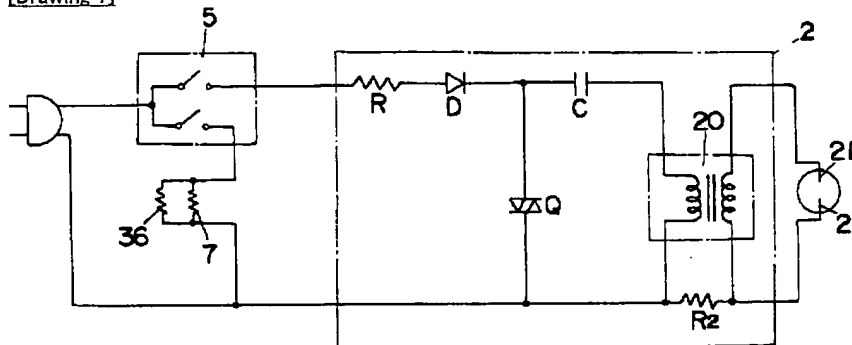
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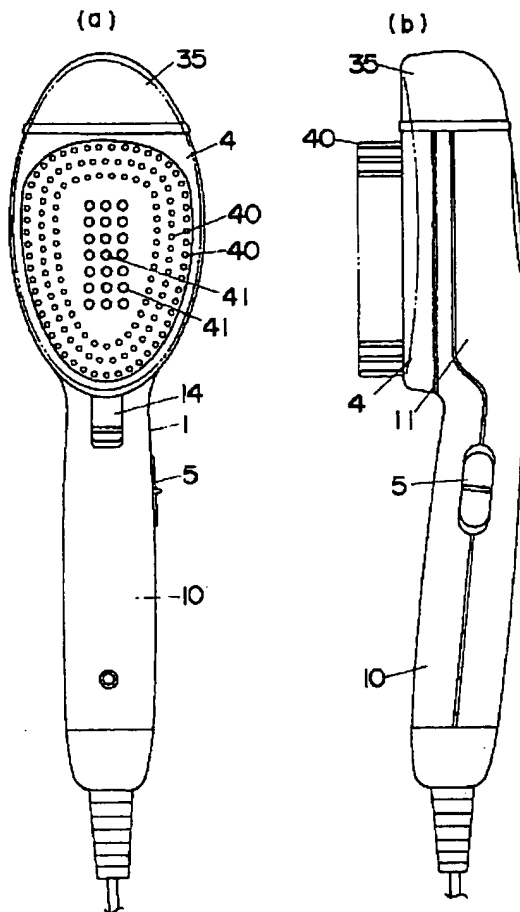
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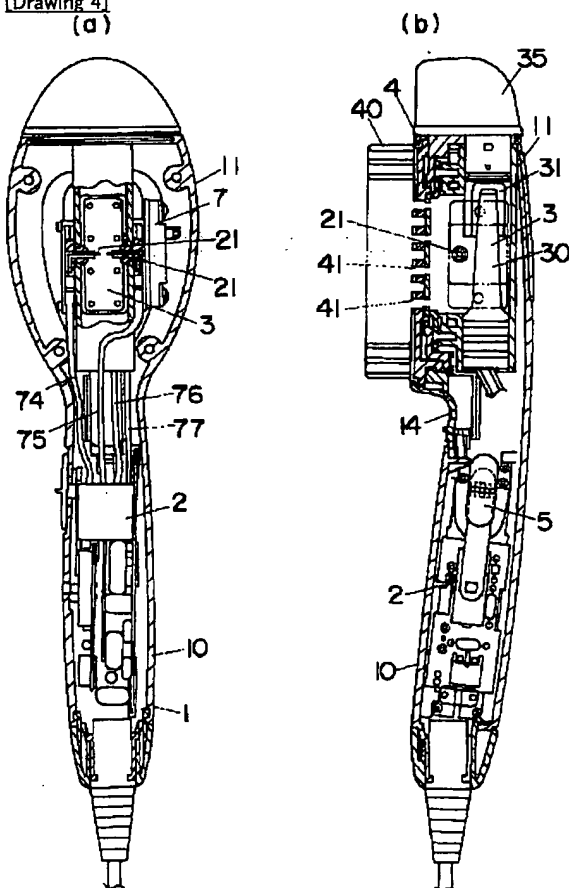
[Drawing 7]



[Drawing 3]

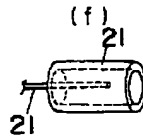
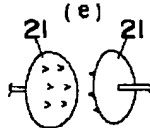
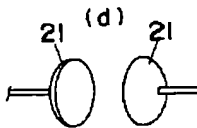
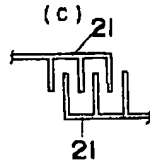
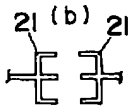
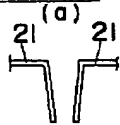


[Drawing 4]
(a)

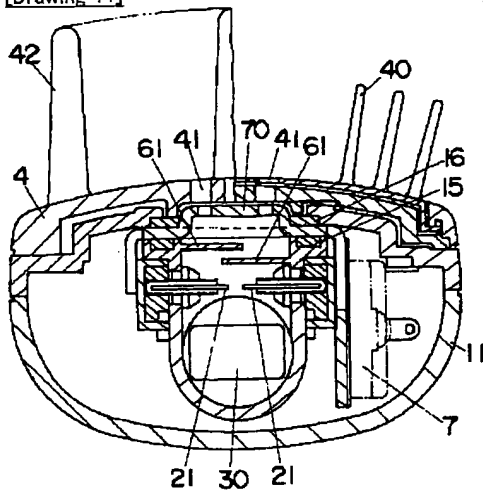


(b)

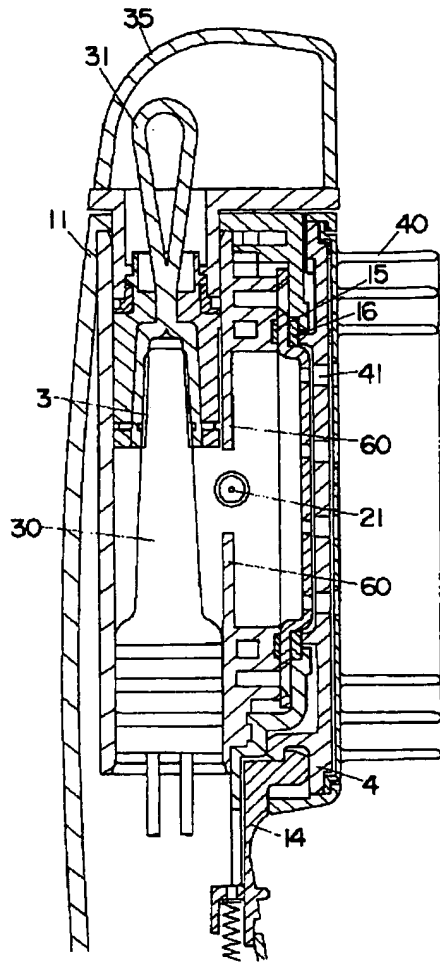
[Drawing 8]



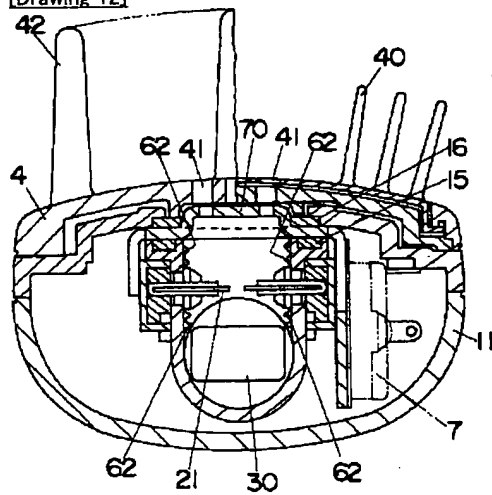
[Drawing 11]



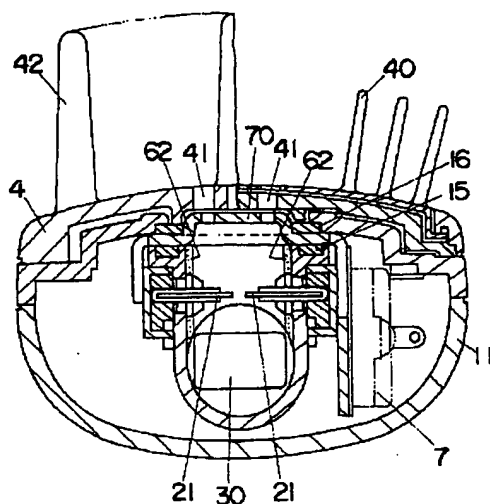
[Drawing 10]



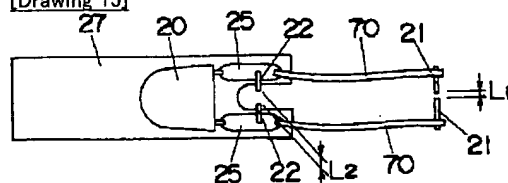
[Drawing 12]



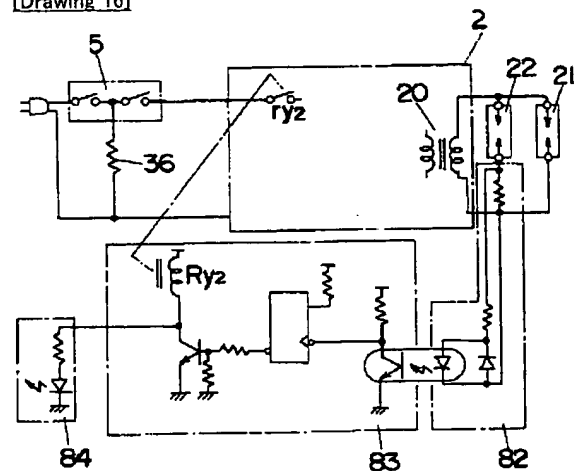
[Drawing 13]



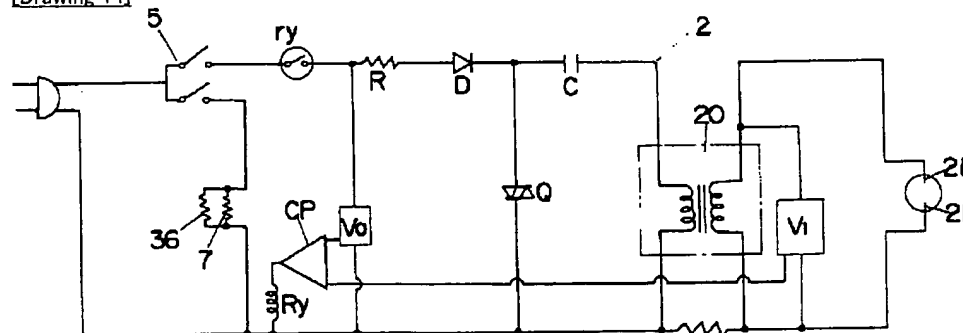
[Drawing 15]



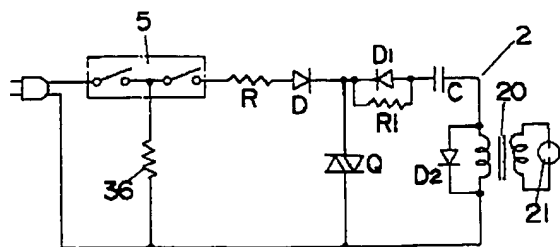
[Drawing 16]



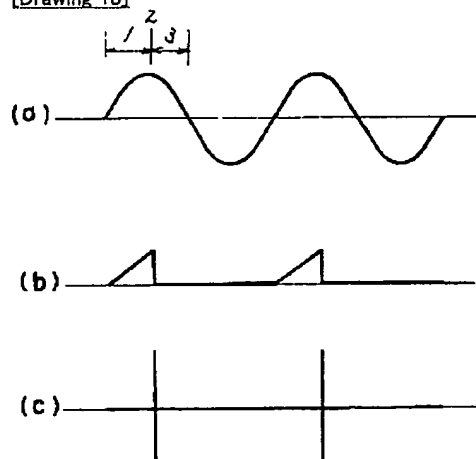
[Drawing 14]



[Drawing 17]



[Drawing 18]



[Translation done.]